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Title:	Exploring Recent Trends in Blockchain Technology A Systematic Literature Review
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Exploring Recent Trends in Blockchain Technology: A Systematic Literature Review

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Abstract- **Blockchain technology is used to maintain the ever-growing list of data records. Blockchain can be an authentic ledger which includes applications such as fund transfers, settling trades voting, and several other useful components. However, there are still many underlying challenges associated with blockchain technology. Blockchain (database) is older but a new approach in information technology whose first implementation is Bitcoin (crypto currency). Bitcoin has also used Blockchain technology at its back end to keep a permanent record (chains of block) of all the data. Bitcoin is the primary appliance that formed decentralized surroundings designed for Crypto money, wherever the participant is capable of acquiring and substituting production with Digital cash. Therefore, a confirmed contract could involve crypto cash, contracts, report, or other information. The current study aims to describe a comprehensive synopsis of the blockchain concept which could also be used in many other applications. The most essential material goods of blockchain are made with the aim that there is no essential overseer or any centralized information storage space routine. Hence, Blockchain transactions occur only in peer to peer network which is distributed among several nodes. Therefore, Blockchain expertise could be an innovative implementation of possible applications, in favor of an organization that enables a safe and sound connection exclusive of the necessitated essential power. The current study proposed and analyzed the possible function of blockchains within a structure throughout a case examination. In addition to do a systematic literature analysis Blockchain technology is expected to bring developments in diverse**

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fields, such as politics, economy, culture, industry, and business models. Therefore, the scholarly research discovered the variety of drivers designed for blockchain accomplishment while highlighting the barriers and risk inborn within the chunk string (Blockchain).

Index Terms- **blockchain, bitcoin, crypto currency, peer-to-peer network, scalability**.

I.Introduction

Blockchain is a decentralized ledger of every part of connections transversely, a Peer-to-Peer system [1]. By using this type of tool, the participant could authenticate contact which is exclusive of the necessitated essential power [1]. It includes appliances like account transfer and locale trade appointment, in addition to numerous added uses of these tools [1]. Block Chain is a scattered record resolution with the purpose to retain a constantly increasing record of information account, with the aim of being deep-rooted by means of nodes participating inside it [2]. Therefore, in the order of each operation accomplished facts are stored within a free ledger. [1]. Block Chain is a decentralized outcome which does not have any social gathering involvement [3]. Therefore, the order within,

regarding each transaction is accomplished during Blockchain which is available to each part of the nodes [1]. Their features make a structure by establishing and identifying organizational boundaries which are translucent than other central connections that connect a third-social network [4]. During accumulation, nodes inside the Blockchain is entirely unnamed, which makes it additionally protected for the further nodes to verify the contact [5]. First of all, blockchain is an immutable ledger which facilitates the recording transactions of a business network [6]**.** Bitcoin has produced decentralized surroundings designed for Crypto cash, for a participant who is ready to acquire and swap over commodities by using digital currency [7]. Blockchain organism is a decentralized distributed ledger that provides a lot of reward; creates immutability, simplicity, reliance, defense audit ability, and distinct resource of accuracy among others. A database usually has in progress the direction of dislocating an amount of industry such as endowment, assurance, logistics, and power in addition by means of its capable compensation in addition to a variety of applications [3]. Blockchain is calculated to work in a decentralized manner, while

databases are all time centralized [8]. This exclusive characteristic of blockchain gives it the control it requires to become the subsequent invention for tools [9]. The concept used behind the blockchain technology is discussed below in the Figure.1.
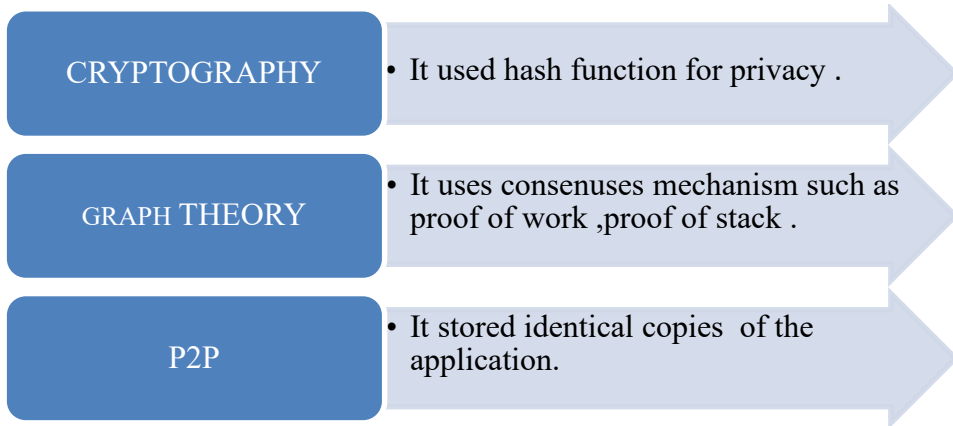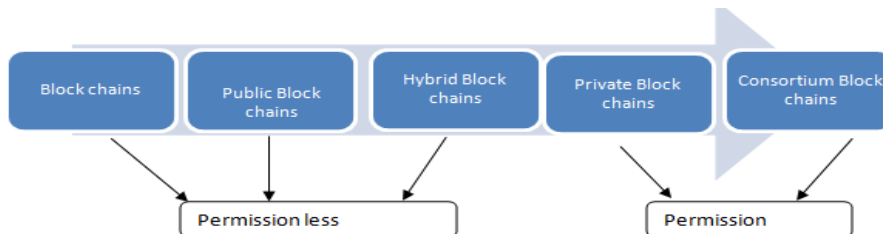

Fig. 1. Basic terms of BST

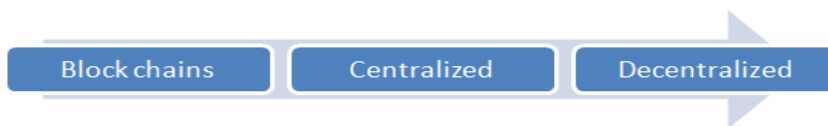Figure 2: Types of Block Chain in permission point aspect

Fig. 2. Types of BST

A. Distributed Ledger Technology

Block chain is a kind of distributed ledger technology (DLT). Within DLT contacts are record by the way of an unchallengeable cryptographic name which is called a jumble [10]. Blockchain is a system that protects

the structure of the database [**11**]. Properties of DLT are discussed below.

Table I

Properties of DLT

1. Programmable	A blockchain is programmable [11].
2. Secure	All stored facts are discretely encrypted [11].
3. Disseminated	Each and every network participant comprises a duplicate of ledger designed for an entire simplicity [11].
4. unspecified	The characteristics of participants are pseudonymous [11].
5. Unanimous	The entire system's participants are of the same opinion about the authority stored data [11].
6. Unchallengeable	All the updated and existing reports cannot be distorted [11].
7. Time stamped	A transaction timestamp is stored on every block [11].

B. *Types of Block Chain*

Blockchain has different types. It is categorized according to its specific criteria. We have discussed its major types in Figure.2 and Figure.3.

3rd

The transaction is broadcasted to a peer-to-peer network[12].

3. The network of nodes uses algorithms to validate the transaction and users status[12].

4th

4. A verified transaction can involve cryptocurrency ,contracts ,recrds or other information[12].

1st.
A trasaction is requested[12] .

5th

The transaction is combined with other transactions ,once verified ,to create a new block of data for the ledger[12].

6th

The new block is added to the existing blockchain (which is permanent and unalterable)[12].
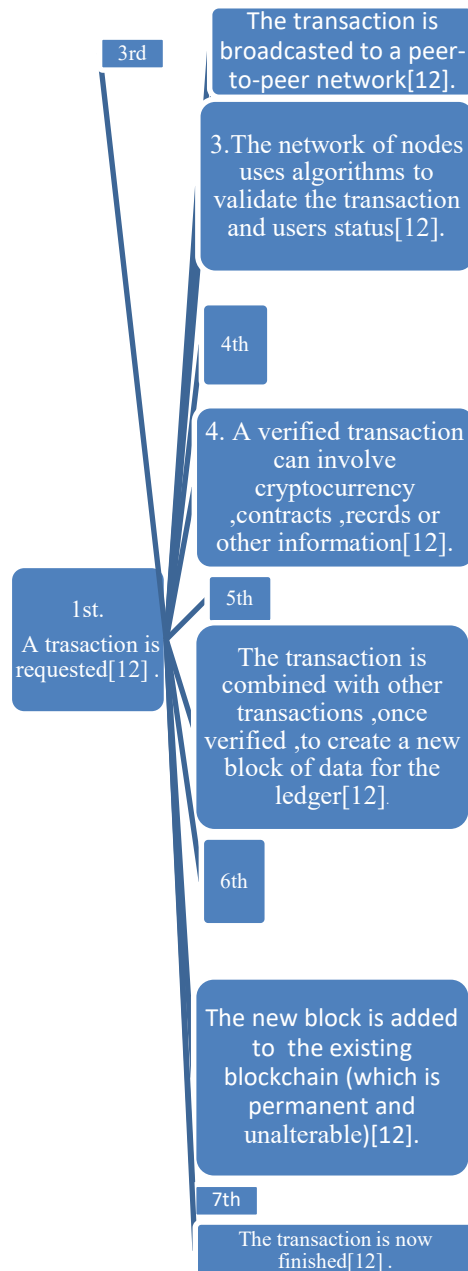
7th

The transaction is now finished[12] .

Fig. 3. Working Flow of Block Chain Technology

C. Working of Block Chain Technology

Proof-of- Work	Proof-of-Space	Proof-of-elapsed time
• Proof-of-work is one of the first consensus protocols that are used in blockchain application [13]. • It depend on computing the hash values and validating the transctions until a specified number of trailing zeros are found in the hash value [13]. • The number that generates the hash with the specifed number of trailing zeros is known as a nonce [10]. • A nonce is defined as a rendom number that generates the specifiefd number of trailing zero in the hash function [10].	• Proof-of-space, also knows as PoSpace, and it is similar to the proof of work consensus protocol [13]. • Insted of the computational resourses, PoSpace use disk storage to vaildate transactions [13].	• Proof-of-Elapsed time is a network. consensus protocol developed by the intel corporation [13]. • The algorithm is predominantly used in permissioned blockchain ledgers[10]. • The hardware use in PoET is specially desognedfor this protocol[10]. • for example, Intel Software Guarded Extension (SGX)is used in network using PoET[13].

Fig. 4. Country implementation detail

II. Research Methodology

Systematic Literature Review (SLR) is a scheme which estimates and summarize the empirical evidences of the primary research. .SLR allows the gatherings from databases restrictively and provides an empirical process that values transparency. Therefore, SLR allows an examination of conventional reviews and synthesized findings. Hence, SLR uses both qualitative (existing literature) and quantitative approaches (existing experimental study findings) for the metaanalysis.
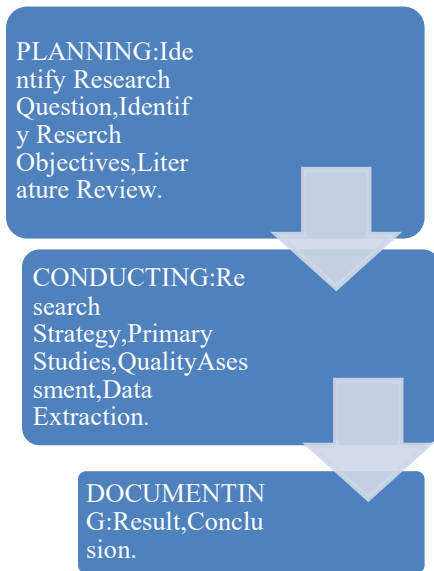
Fig. 5. Country implementation details

Block chain technology has been implemented in different countries. Hence, a few countries are discussed in Figure.6 and Table.2.
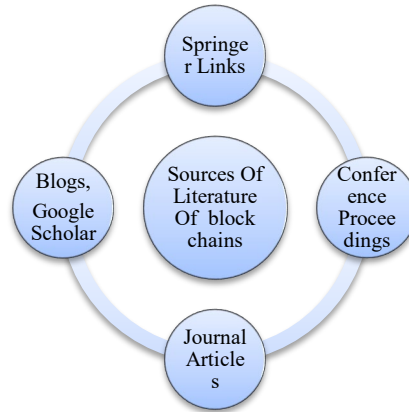

Fig. 6. Literature resources

A. Research Objectives

The primary objective of this research is to investigate specific subject research questions. Therefore, to do a systematic analysis we have incorporated SLR as a methodology.. Therefore, these specific research questions play an essential role in stating these research questions. To study these questions for the SLR we thoroughly planned and discussed briefly these objectives in Table.2.

B. Implementation of Block Chain Technology in Different Countries

Table II
Objective of Examine

S.N	Examined questions	Motivations
1	What is the role of block chain in different area of state?	The main motivation to study the different states for data storing method.
2	Define data stored framework in different aspects?	The aim is to examine the data storage techniques.
3	Discuss implementation of block chain technology in different countries?	The reason is to write this question is to identify large scale data storage efforts procedures.

Table III

Implementation of BCT in Various Countries

S.N	Papers names	Year	Tools /parameters	Challenges	Consensus algorithms/ functions	Focuses	Block chain application
1	An Overview of Block chain Technology: Architecture, Consensus, and Future Trends [1].	2017	DLT (distributed ledger technology).	Scalability, Privacy Leakage, Selfish Mining.	Proof of work Byzantine consensus algorithm (Ripple, Tender mint).	Blockchain technology (architecture).	Financial domain (Traditional industries to enhance the system by blockchain technology).
2	A Survey of Blockchain from the Perspectives of Applications, Challenges, and Opportunities [15].	2018	Decentralized Infrastructure and peer-to-peer nature.	Technical challenges, Scalability, Privacy Leakage, Selfish Mining.	Elliptic curve digital signature algorithm (ECDSA).	Blockchain technology.	Finance, Iota, public, social service, reputation system, security, and privacy representative application domains of the blockchain.
3	Blockchain Technology Overview [3].	2018	Digital ledgers are implemented in a distributed fashion.	Immutability, Users Involved in Blockchain Governance, Cyber security.	Cryptographic functions (hash function) , SHA-256 and consensus algorithm(Proof of work, Proof of stack, round robin, Delegated PoS, Proof of Authority, Proof of Elapsed Time (PoET).And also performed mining.	Permission and permission less blockchain network.	This paper presents many areas that organizations should consider when investigating blockchain technology.
4	Business Innovation based on artificial intelligence and Blockchain technology [19].	2022	DLT and A.I(Machine learning)	The Shared values and concept in business is more challenging.	Business model framework.	Machine learning and shared data.	Usage in business, the social and economic institutions.

S.N	Papers names	Year	Tools /parameters	Challenges	Consensus algorithms/ functions	Focuses	Block chain application
5	Blockchain and e-government innovation: Automation of public information processes [11].	2021	DLT, E-government.	potential regulatory collisions and information leaks	Blockchain registry chronologically.	Digitalized economy.	Automation in e-government.
6	Blockchain Solutions for Big Data Challenges [18]	2017	DLT, Bitcoin	The ecosystem of tools that Big Data use.	Multiparty Computation MPC protocol.	Storing big data.	Smart contracts; internet of things; healthcare.
7	Blockchain Technology: Is it Hype or Real in the Construction Industry? [2].	2020	DLT	Data Privacy, Data Storage, Scalability, High Computation Power.	Security, Anonymity, No Single Point of Trust, Fraud Resistance, Non-Physicality.	Industry 4.0. Its construction industry mitigates the existing issues in the current construction systems.	Block chain 1.0 for crypto currencies. Block chain 2.0 was recognized for economic, market, and financial applications. Blockchain 3.0 was identified as applications beyond currency, finance, and markets.
8	Introduction to Blockchain Technology [3].	2019	DLT	Cyber security	Denial of Service (DoS) attacks.	Various types of attacks	Glob us Security Architecture.
9	Application of Blockchain Technology in Higher Education [17].	2020	DLT	The system of higher education and the entire society is currently facing.	Massive open online courses.	Copyright protection	higher education, smart contract, digitalization of education,

S.N	Papers names	Year	Tools /parameters	Challenges	Consensus algorithms/ functions	Focuses	Block chain application
10	Blockchain technology and its applications to combat COVID-19 pandemic [16].	2020	DLT	It detects newly infected cases and predicts coronavirus infection risk.	Hash log blockchain solution can be enabled by distributed Res. Biomed. Eng. Blockchain ledger technology.	Focuses on COVID -19. Also, document on ledger.	Usage in health care.
11	Blockchain Technology Adoption in Smart Learning Environments [6].	2022	DLT	Ethereum network for data protection in online education platforms.	Technology Adoption Models.	Decision-makers in building a smart learning environment	Usage in the education system.
12	Blockchain Technology and Its Applications: Case Studies [11].	2020	DLT (distributed ledger).	Scalability, security, decentralization.	Consensus algorithms.	Different fields of the use cases.	Smart contracts.
13	The Politics of Block chain [10].	2018	DLT	Blockchain ecosystem.	Consensus algorithm.	Spreadsheet for registering all assets.	Techno-social futurity of blockchain.
14	Blockchain Technology in Healthcare: A Systematic Review [10]	2019	DLT	Errors in data extraction or miscalculation	Prototype implementations.	Including the management of electronic medical records.	Usage in healthcare.
15	Blockchain 3.0 Applications Survey [14].	2020	DLT	The academic community and industry sector.	Consensus algorithm.	Non cryptocurrency related to distributed ledger.	Electronic voting, healthcare records management and identity management systems.

C. Sources of Literature Review

Different research sources are used in this current research. Therefore, the gathered data is collected from different journal articles, conference proceedings, and springer links. Furthermore, Google Scholar was also used to discover literature on this scientific study. Hence, Google Scholar has been established as a helpful means for carrying out this research.

D. Search String

Search string was established for gathering updated data about blockchain technology. Sources which were used to collect data were from Google scholars, journal articles, conference proceedings and Springer links. This string was used as 'Blockchain technology or blockchain application or blockchain implementation'.

E. Search Keywords

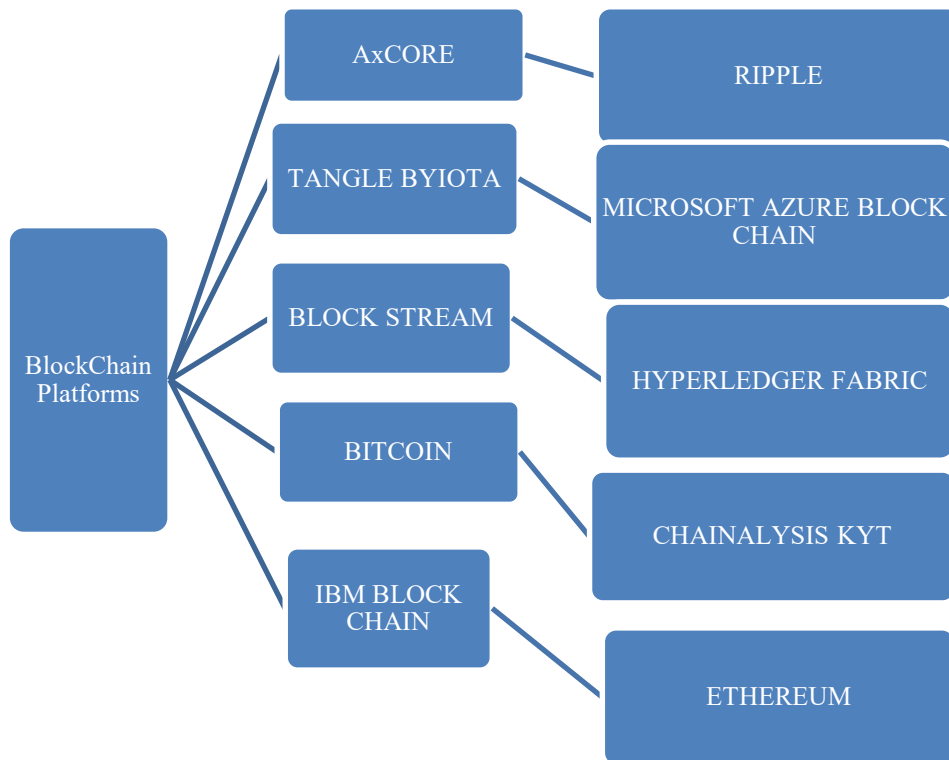Blockchain has diverse platforms. Therefore, different blockchain platforms are discussed in Figure.8

Fig. 8. BCT platforms

F. Implementation of Block Chain

Many agencies and organizations have inhabited guide toward block chain which is appropriate for of a challenging structure. In addition variety of blockchain facts would be useful and advantageous. A numeral of articles and suggestions are highlighted in this current study for the centralized directions, academic circles, procedural publications, tools websites, and Software Developers.

1. United States department of Homeland Security (DHS) Science & Technology Directorate.
2. The American Council for Technology and Industry Advisory Council (ACT-IAC).
3. The Institute of Electrical and Electronics Engineers (IEEE).
4. Technology sites.
5. Software Developers are the authority organizations to study the resolution aspects of Blockchain Technology
6. These all organizations have discussed the need for blockchain technology to implement blockchain frameworks. Therefore, this current study states the recent trends of blockcahin technology by incorporating SLR as a methodology to investigate the future of Blockchain.

III. Literature Review

Overviews about blockchain technology are compared distinctively with consent algorithms of blockchains. Therefore, in this current research analyzes and compares this protocol in dissimilar respect. Moreover, we have also listed various challenges and troubles that would delay blockchain expansion and summarized several accessible approaches for resolving these troubles. We discussed briefly the summary of all papers below in Table.4 region wise to contribute in the literature which is represented in Figure 9.
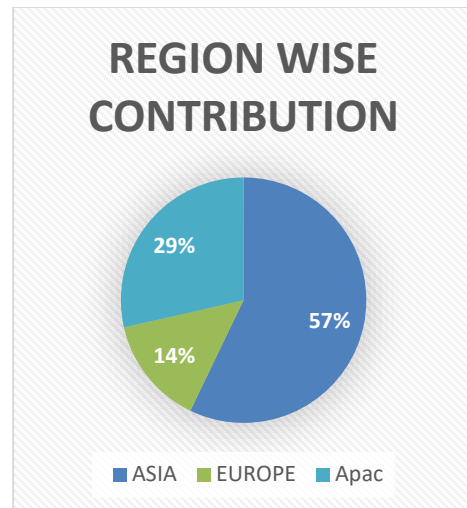

Fig 9. Region Wise Contributions

A. Block chain Applications usage chart

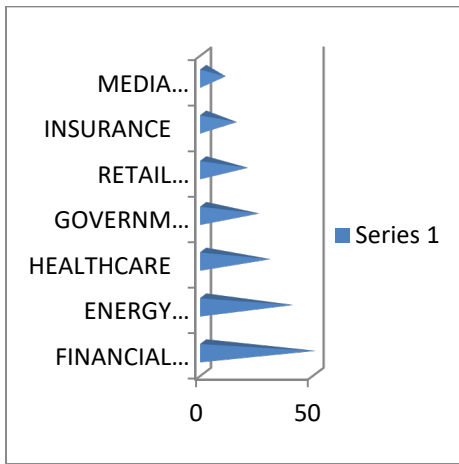Blockchain plays a vital role in different applications. These applications are discussed briefly in Figure.9.

Fig. 10. Usage of Blockchain Application

B. Limitations of Block Chain

Blockchain is a recent and new trend in information technology which has numerous advantages which promises to solve all the problems. However, the technology at the heart has the following disadvantages:

1. It requires powerful hardware resources.

2. One of the biggest issues of Blockchain technology is scalability.

3. An additional, test which lies on the border of its equipment is privacy preservation.

C. Future Directions and Recommendations

Blockchain is a foundational technology. With the recent trend of information technology Blockchain has created an eye-catching image with its contracts and transparent database. Therefore, the researchers have briefly discussed the usage, scope, and strategic implications of Blockchain by using a systematic literature review methodology (SLR). Therefore, Blockchain presentations attract investors by providing enormous returns. For this reason, in the current study we used different techniques in favor of blockchain-based solution to establish its significance and the tradeoffs. Its procedure is categorized in two phases of consistency and difficult stage. The primary stage confirms the claim of developers concerning their blockchain resolution based on a few set criteria. It also studies the smart contracts which are further divided into two types: expansion and estimation. Furthermore, ethereal has given the

infrastructures to organize numerous smart-contracts based solution, such as car auctions, online trade, and so on. Whereas, assessment refers to concert and rules examination. For instance, in the here and swift examination we do not usually study blockchain mixing through other technology for defense and confidentiality purpose. However, during the upcoming detailed examination, blockchain assimilation with huge data, simulate acumens and Internet of thing can be measured for enhanced sustainability. Ethereal plays a foundational purpose to organize the smart-contracts used to decentralize computing. Therefore, the data for every transaction is stored and shared with all its users. Blockchain has significantly captured the customer market because of its secure networking and control records. Hence, the current study highlights that Blockchain technology networks have unique characteristics which could be aligned with different digital platforms for their smooth running.

IV. Conclusion

Blockchain, the establishment of Bitcoin, has been recently acknowledged for its secured networks. Blockchain serves like a firm ledger that allows contact to acquire lay in a decentralized behavior. Block chain-based applications could help individuals, organizations, machines and algorithms to freely interact and transact without any friction., Furthermore, blockchain observable facts affect a variety of aspects of human life. This exclusive attribute of blockchain, is simply based on independent Peer-to-Peer connections. In addition to association, resolve finally allows to essentially advance unrestricted examine release sculpt; and consequently, enlarge unrestricted assurance in e-government by constructing it more competent, answerable as well as apparent. Blockchain creates a decentralized distributed ledger that provides a few compensations; creates immutability, simplicity, reliance, defense, and audit ability. This particular fact highlights the progress of the numeral industry such as economics, assurance, logistics, and power. Hence, this current study concludes and expose the variety of drivers that are in favor of blockchain accomplishment. A small number of researchers have established the barriers and intrinsic risks of the blockchain. Therefore, this paper provides a significant examination of blockchain technology applications by considering its

applicability opportunities. Thus, the conducted examination of projects and research connects blockchain technology to higher education enabling it to eliminate its status of new and advanced fame technology. The critical grouping of blockchain technology with other upcoming technology, such as synthetic acumen, huge data, and obscure computing, could efficiently curtail the worldwide spread of a global pandemic such as COVID-19.

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